WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device comprising:

a step of preparing a structure including a plurality of cylinder-shaped members and a region surrounding the cylinder-shaped members;

a step of forming a porous body having cylinder-shaped pores by removing the cylinder-shaped members from the structure; and

a step of introducing a material into the pores of the porous body and forming p-n or p-i-n junctions.

2. A method according to claim 1, wherein said cylinder-shaped members formed so as to contain a first material are surrounded by said region formed so as to contain a second material in said structure and the structure contains the second material at a ratio of not smaller than 20 atomic% and not greater than 70 atomic% relative to the total quantity of the first and second materials.

3. A semiconductor device obtained by forming p-n or p-i-n junctions in a porous body formed by removing cylinder-shaped members from a structure including the cylinder-shaped members and a region surrounding the cylinder-shaped members.

4. A device according to claim 3, wherein said cylinder-shaped members formed so as to contain a first material are surrounded by said region formed so as to contain a second material in said structure and the structure contains the second material to a ratio of not smaller than 20 atomic% and not greater than 70 atomic% relative to the total quantity of the first and second materials.

5. A semiconductor device array formed by arranging a plurality of semiconductor devices on a substrate, said device array comprising:

a porous body having cylinder-shaped pores and formed by removing cylinder-shaped regions from a structure including a matrix member comprising a second ingredient capable of forming a eutectic crystal with a first ingredient and the cylinder-shaped regions comprising the first ingredient and dispersed in the matrix member;

semiconductor regions formed in the pores, each of the semiconductor regions having at least a p-n junction or a p-i-n junction; and

a pair of electrodes arranged as sandwiching the semiconductor regions.

6. A semiconductor device array formed by arranging a plurality of semiconductor devices on a

substrate, said device array comprising:

semiconductor regions formed by filling a semiconductor material into cylinder-shaped pores of a porous body, the porous body being formed by removing cylinder-shaped regions from a structure including a matrix member comprising a second ingredient capable of forming a eutectic crystal with a first ingredient and the cylinder-shaped regions comprising the first ingredient and dispersed in the matrix member, and subsequently removing the matrix member, each of the semiconductor regions having at least a p-n junction or a p-i-n junction; and

a pair of electrodes arranged as sandwiching the semiconductor regions.

7. A device array according to claim 5, wherein said semiconductor devices are diodes.

8. A device array according to claim 5, wherein said semiconductor devices are transistors.

9. A device array according to claim 5, wherein the ratio of the second ingredient of the matrix member of said porous body relative to said structure is not smaller than 20 atomic% and not greater than 70 atomic%.

10. A device array according to claim 5, wherein

the first ingredient of said cylinder-shaped regions is aluminum and the second ingredient of said matrix member is silicon.

11. A device array according to claim 9, wherein the first ingredient of said cylinder-shaped regions is aluminum and the second ingredient of said matrix member is germanium.

12. A device array according to claim 5, wherein the principal ingredient of said porous body is silicon.

13. A device array according to claim 5, wherein the principal ingredient of said porous body is germanium.

14. A device array according to claim 5, wherein said cylinder-shaped regions are made of a crystalline material and said matrix member is made of an amorphous material.

15. A method of manufacturing a semiconductor device array comprising:

(a) a step of arranging an electrode on a substrate;

(b) a step of forming a structure including a matrix member containing a second ingredient capable of

forming a eutectic crystal with a first ingredient and cylinder-shaped regions containing the first ingredient and dispersed in the matrix member on said substrate;

(c) a step of removing said cylinder-shaped regions;

(d) a step of forming semiconductor regions, each having at least a p-n junction or a p-i-n junction, in the cylinder-shaped pores obtained as a result of the above removing step;

(e) a step of forming another electrode on the top of said structure in which said semiconductor regions are formed.

16. A method according to claim 15, wherein etching is used for said removing step.

17. A method according to claim 15, further comprising a step of chemically treating the matrix member containing said second ingredient after the step of removing said cylinder-shaped regions.

18. A method according to claim 17, wherein said chemical treatment is oxidation.

19. A method according to claim 15, further comprising a step of increasing the pore diameter of the cylinder-shaped pores after the step of removing

said cylinder-shaped regions.

20. A method according to claim 15, further comprising a step of removing said matrix member surrounding said cylinder-shaped regions after the step of forming another electrode on the top of said structure.

21. A method according to claim 15, wherein a chemical vapor deposition method is used for said step of forming semiconductor regions.

22. A method according to claim 15, wherein said step of forming semiconductor regions is performed by means of a catalytic reaction after forming a catalyst at the bottoms of said pores.